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Friedlander

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(54) **SYSTEM AND METHOD FOR CONFIGURING OPERATION OF A REMOTE CONTROL BY A DISPLAY DEVICE**

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H04L 17/12 (2006.01)

(52) **U.S. Cl.** **341/176; 348/352; 348/725; 348/734**

(58) **Field of Classification Search** 348/725, 348/734, 352; 340/12-22, 426.13; 341/176
See application file for complete search history.

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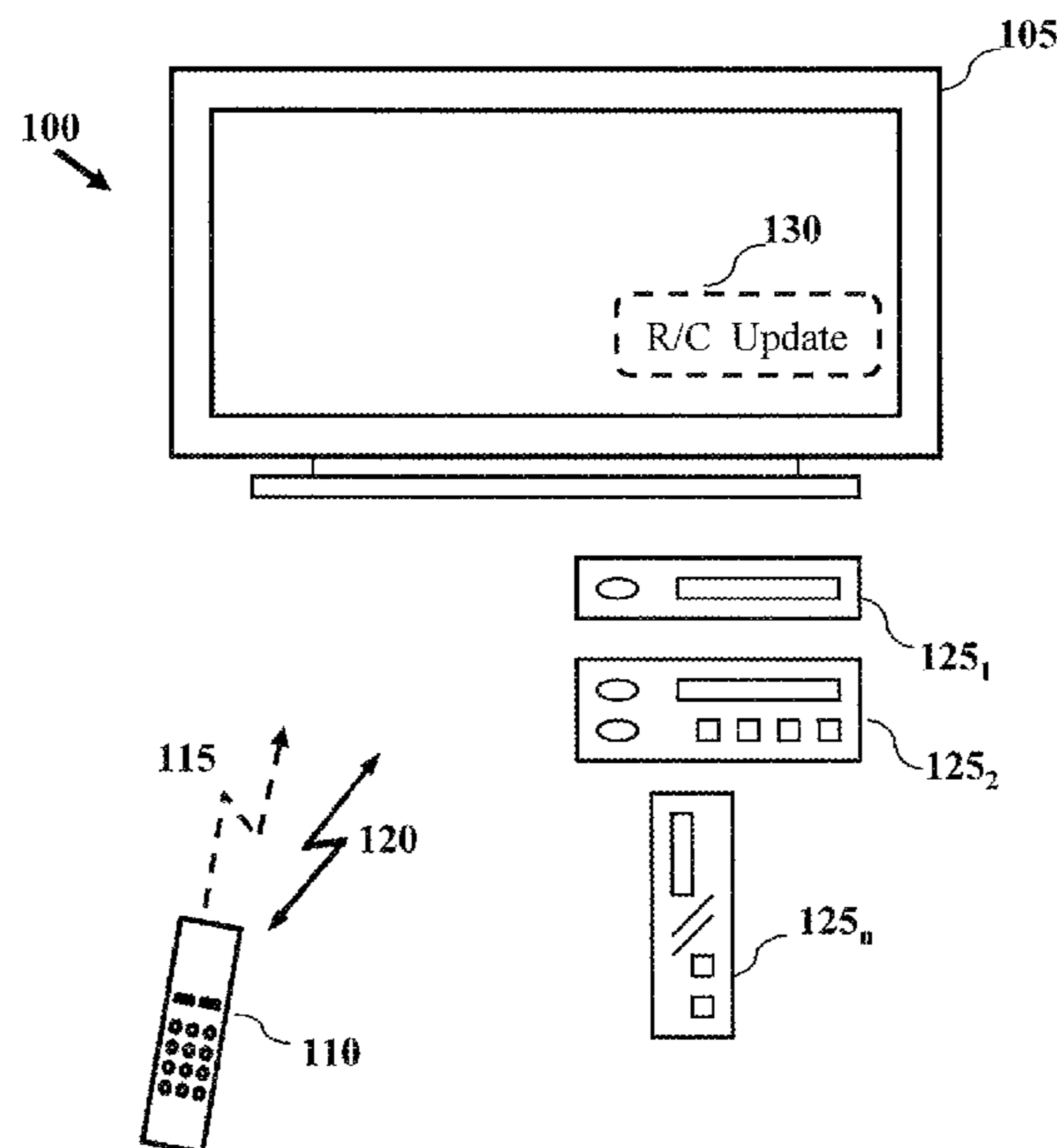
Primary Examiner — Linh Nguyen

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(57) **ABSTRACT**

System and methods are provided for configuring operation of a remote control by a display device. In one embodiment a method includes detecting user selection of an input of the display device and determining a command for the remote control based on the user selection of the input, wherein the command identifies a configuration for the remote control. The method further includes transmitting the command to the remote control, by the display device, for configuration of the remote control, wherein the configuration specifies operation of the remote control with one or more devices associated with the input.

24 Claims, 3 Drawing Sheets



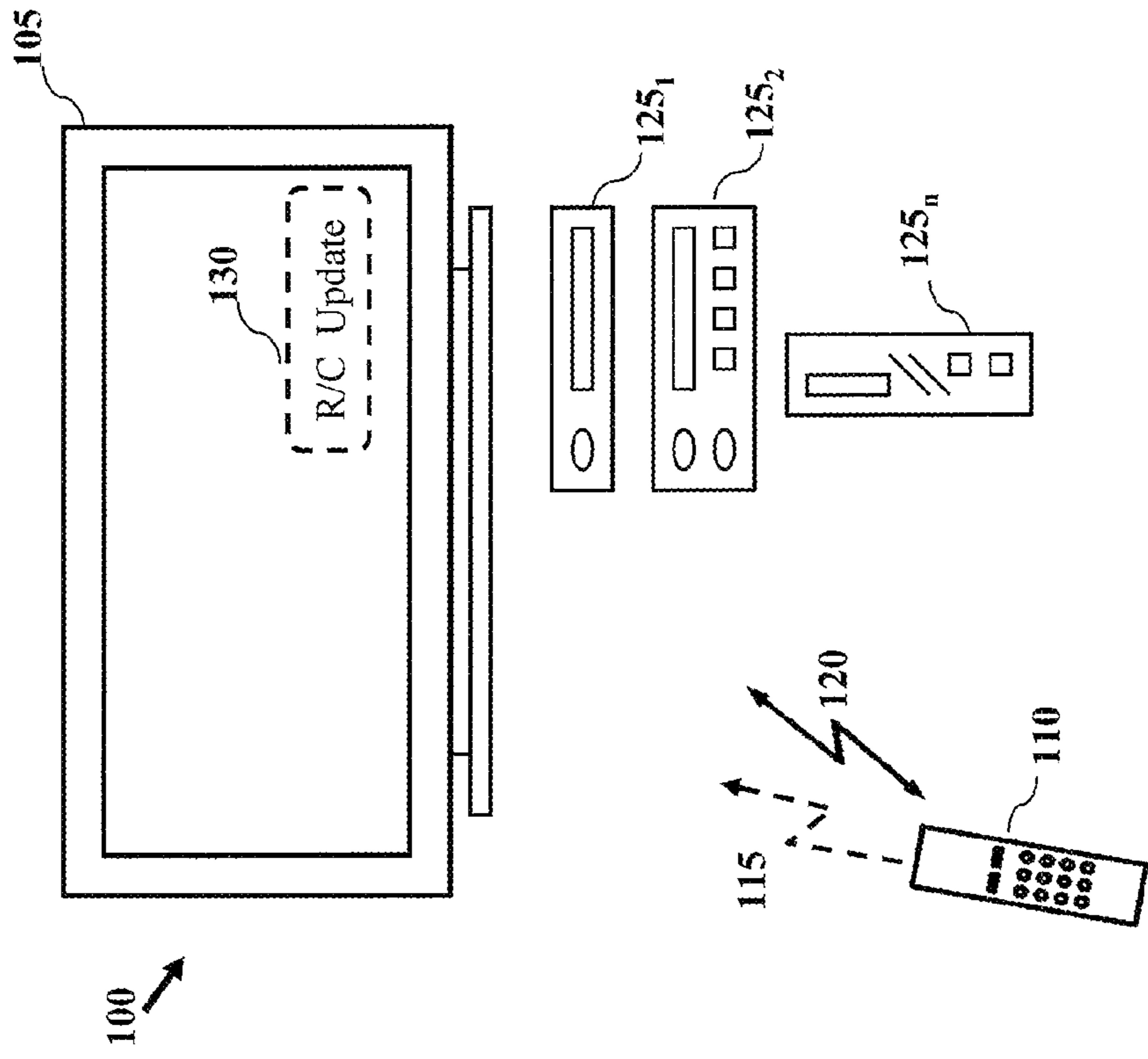


Fig. 1

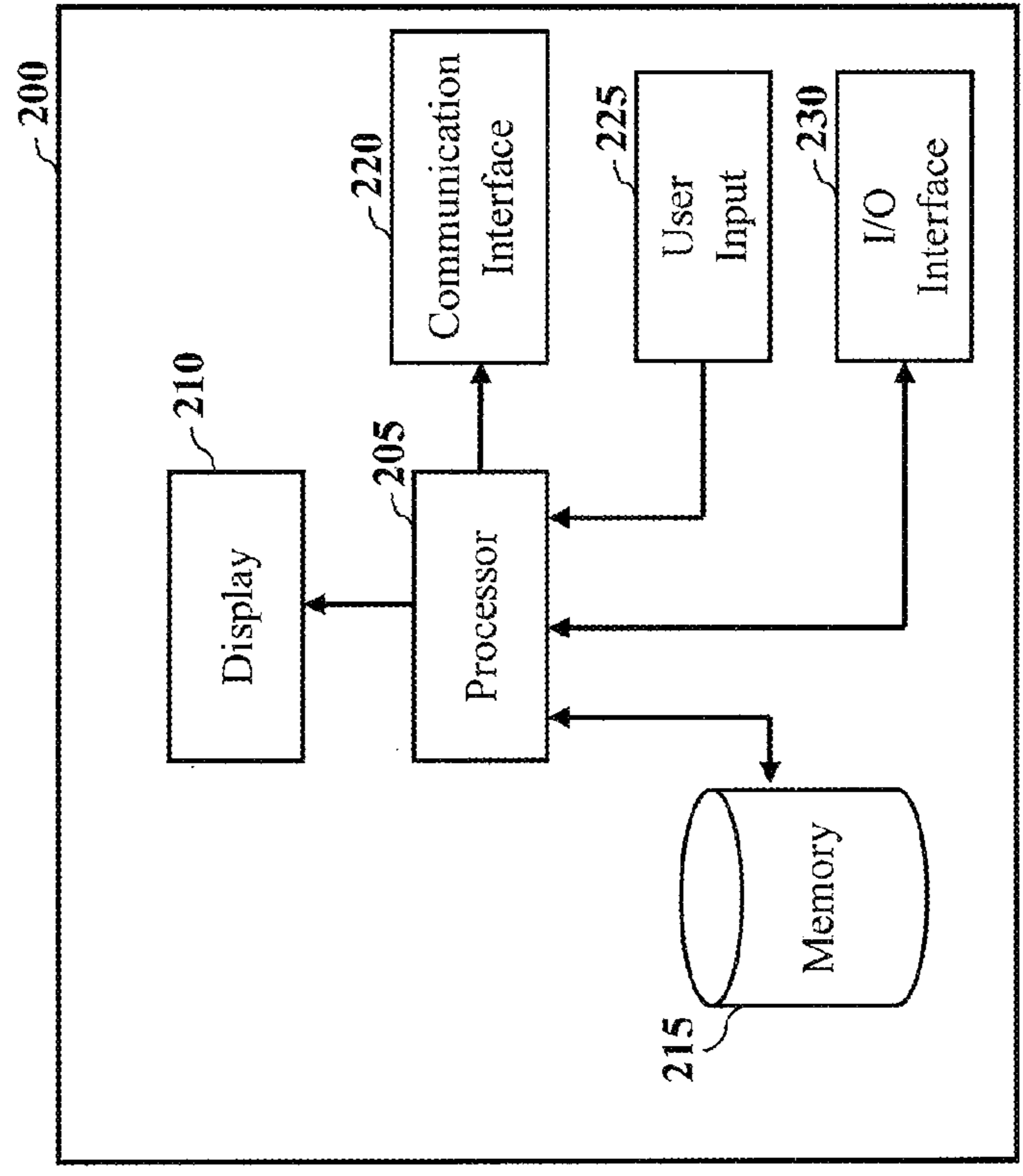


Fig. 2

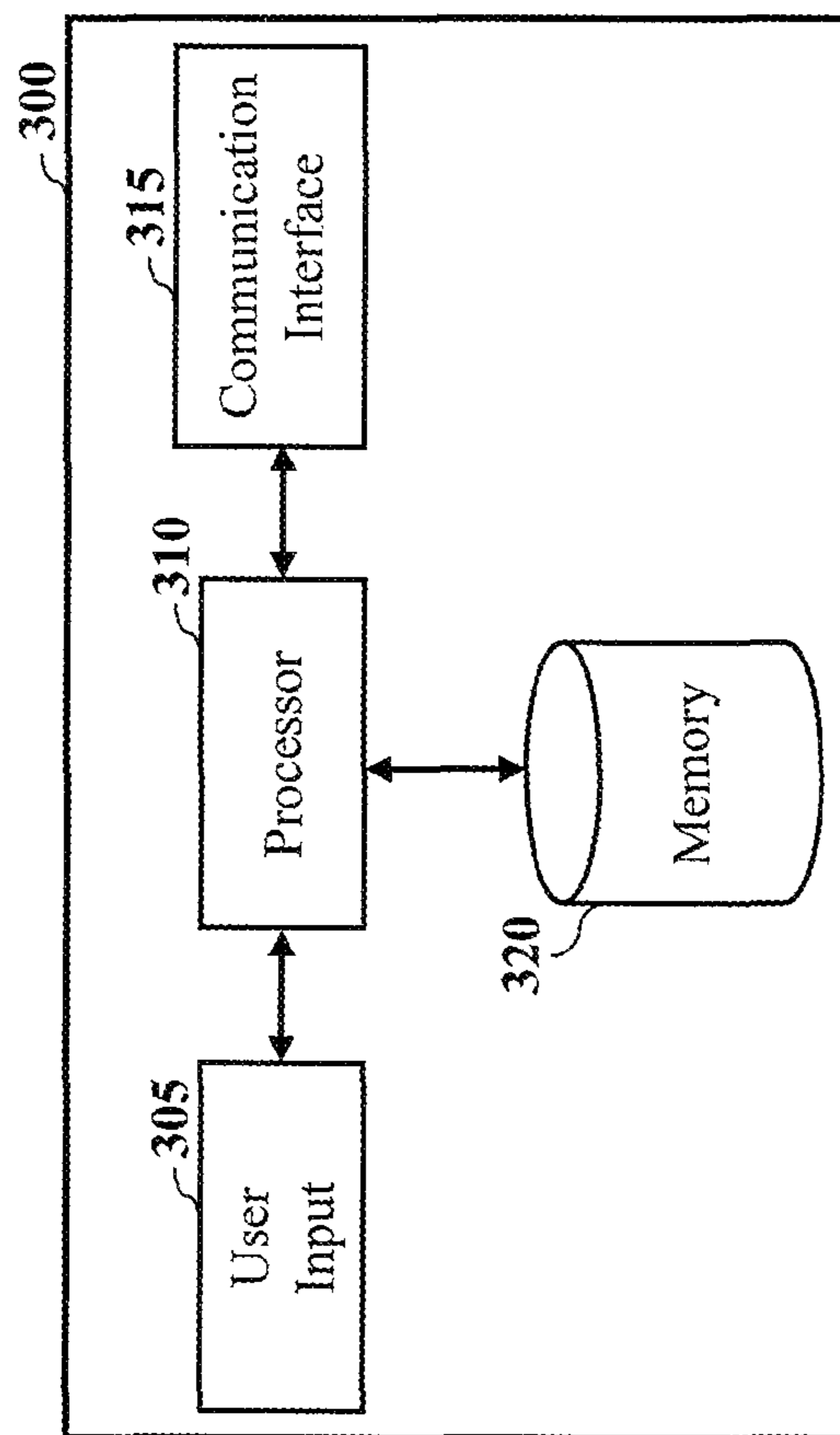


Fig. 3

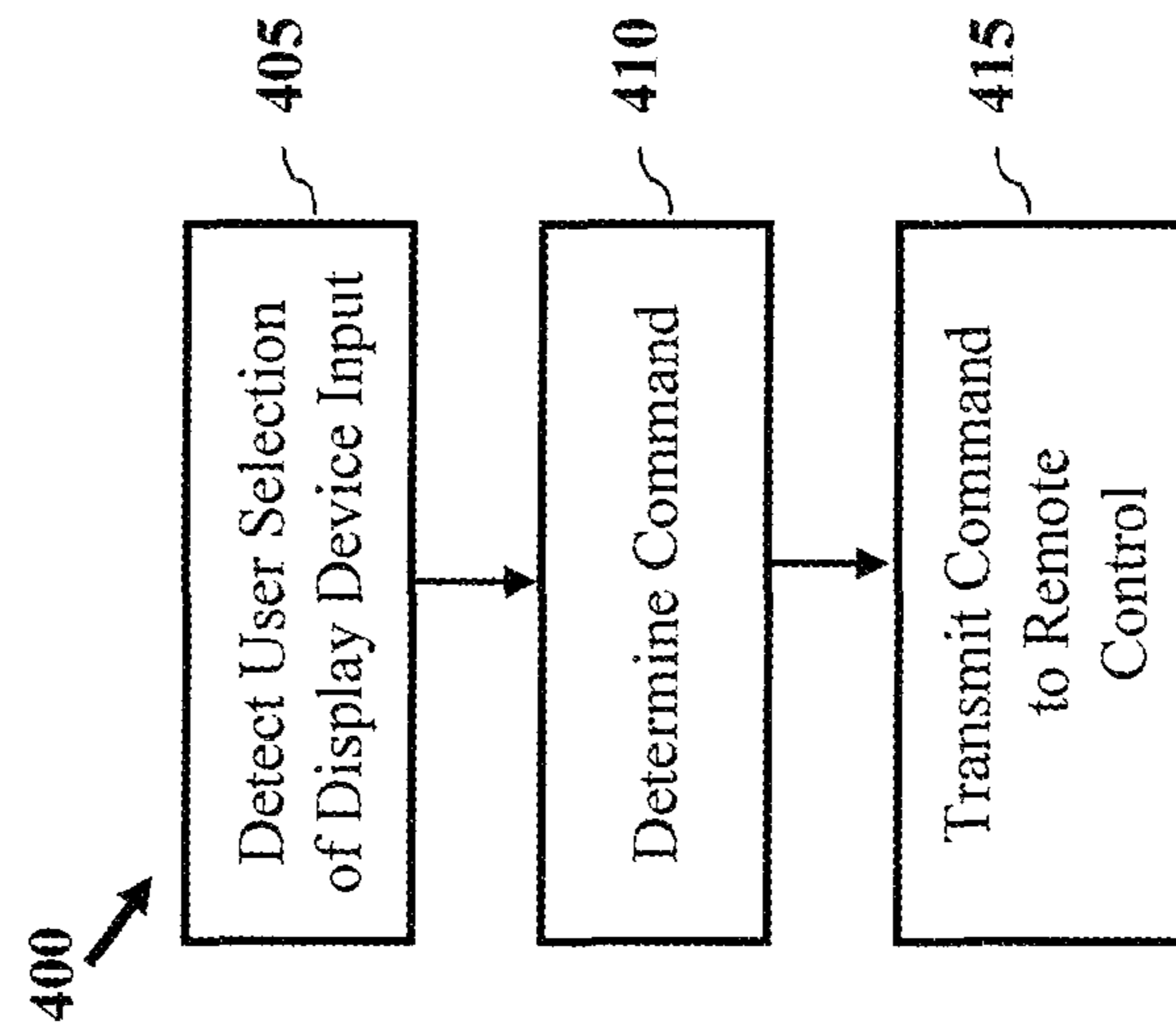


Fig. 4

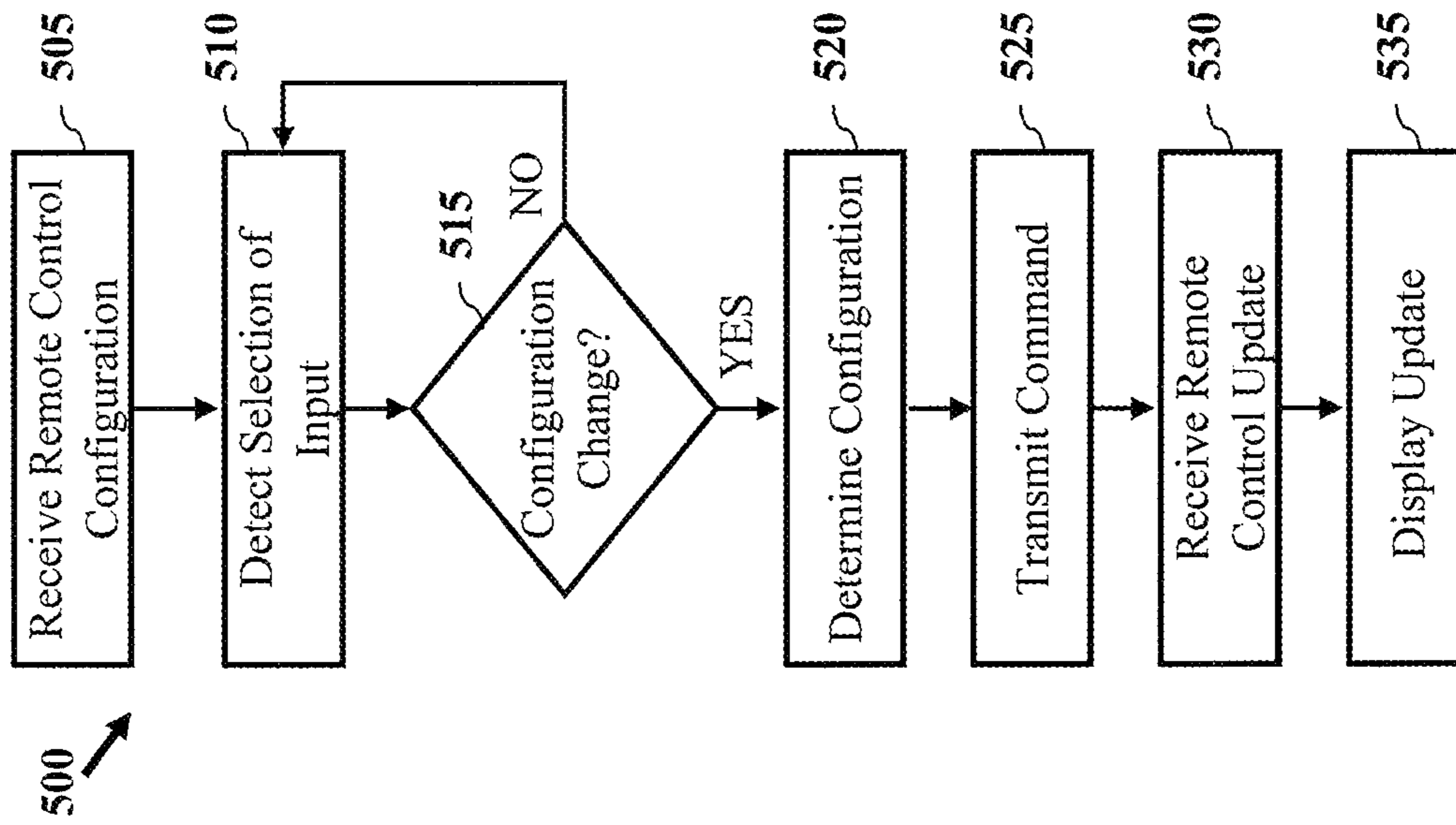


Fig. 5

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**SYSTEM AND METHOD FOR CONFIGURING
OPERATION OF A REMOTE CONTROL BY A
DISPLAY DEVICE**

This application claims priority to U.S. Provisional Appli- 5
cation No. 61/251,074 filed Oct. 13, 2009.

FIELD OF THE INVENTION

The present invention relates generally to configuring a 10
remote control for operation with one or more devices.

BACKGROUND OF THE INVENTION

Many consumers own at least one device which may be 15
operated by a remote control. A great number of these consumers typically use a separate remote control for each of their devices. This can result in remote control clutter and can even result in user difficulty in controlling multiple devices. A typical approach involves the use of programmable remote control. However, many users find programming and/or operation of universal controllers to be difficult. Further, many devices require transmission of commands based on manufacturer settings. For example, subscribers of satellite programming are typically required to utilize a subscriber provided set-top box which usually does not operate with the remote control provided by a manufacturer of a display device. One conventional solution is to provide a programmable remote control by a manufacturer, such as satellite provider, which may operate with one or more devices. Although configurable remote controls exist and may provide optical control for display devices other media devices, these devices typically do not provide more than one type of communication. Further, many users are deterred from programmable remote controls due to difficulty in programming and/or bulk associated with remote control packaging. Thus, users may still be required to retain one or more manufacturer remote controls for operation of their electronic devices. Further, these devices do not allow for configuration of the remote control by the display device. 30

Conventional remote controls can also be limited in their ability to provide user customization and flexibility of controller functions. Many existing "universal" remote controls are limited to operation with one device at a time. For example, these remote controls may be configured to transmit line of sight commands only. In some cases, these devices operate only one device at a time and thus, require a user to provide separate commands to each device. Further, the conventional devices do not allow for operation of a remote control based on activities of a user, such as viewing broadcast media or viewing recorded media. As a result, the conventional methods and devices do not provide users a desired flexibility for control of two or more devices. Additionally, the conventional methods do not allow for display devices to configure remote controls. 45

Thus, there is a desire to provide a programmable remote control which is easily programmed and allows for flexible configuration with one or more devices.

BRIEF SUMMARY OF THE INVENTION

Disclosed and claimed herein are a system and method for configuring operation of a remote control by a display device. In one embodiment, a method includes detecting user selection of an input of the display device, and determining a command for the remote control based on the user selection of the input, wherein the command identifies a configuration for 65

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the remote control. The method further includes transmitting the command to the remote control, by the display device, for configuration of the remote control, wherein the configuration specifies operation of the remote control with one or more devices associated with the input.

Other aspects, features, and techniques of the invention will be apparent to one skilled in the relevant art in view of the following detailed description of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The features, objects, and advantages of the present invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify correspondingly throughout and wherein:

FIG. 1 depicts a graphical representation of a system according to one embodiment;

FIG. 2 depicts a simplified block diagram of the display device in FIG. 1 according to one embodiment;

FIG. 3 depicts a simplified block diagram of the remote control in FIG. 1 according to one embodiment;

FIG. 4 depicts a process for configuring operation of a remote control according to one or more embodiments; and

FIG. 5 depicts another process for configuring operation of a remote control according to one or more embodiments.

DETAILED DESCRIPTION OF THE
EXEMPLARY EMBODIMENTS

Overview and Terminology

One aspect of the present invention relates to simplifying operation of a remote control by providing commands to a remote control by a display device. In one embodiment, a display device is provided which may be configured to detect user selection of an input related to one or more devices coupled to the display device. The display device may be configured to transmit one or more commands for configuration of the remote control based on user selection of an input. In that fashion, operation of the remote control will not require the user to select devices prior to making selections on the remote control in certain instances. 40

In another embodiment, a process is provided for configuring operation of a remote control. The process may include transmitting a command to a remote control, wherein the command identifies a configuration for the remote control. The process may be initiated by user selection of one or more input modes and may further allow for automatic transmission of one or more commands to the display device. In one embodiment, the process may be configured to check if a configuration is required for a selected input. In another embodiment, the process may include receiving a current configuration from a remote control. The configuration file may be employed to determine whether a command should be transmitted to a remote control. 55

As used herein, the terms "a" or "an" shall mean one or more than one. The term "plurality" shall mean two or more than two. The term "another" is defined as a second or more. The terms "including" and/or "having" are open ended (e.g., comprising). The term "or" as used herein is to be interpreted as inclusive or meaning any one or any combination. Therefore, "A, B or C" means "any of the following: A; B; C; A and B; A and C; B and C; A, B and C". An exception to this definition will occur only when a combination of elements, functions, steps or acts are in some way inherently mutually exclusive. 65

Reference throughout this document to “one embodiment,” “certain embodiments,” “an embodiment,” or similar term means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, the appearances of such phrases in various places throughout this specification are not necessarily all referring to the same embodiment. Furthermore, the particular features, structures, or characteristics may be combined in any suitable manner on one or more embodiments without limitation.

In accordance with the practices of persons skilled in the art of computer programming, the invention is described below with reference to operations that are performed by a computer system or a like electronic system. Such operations are sometimes referred to as being computer-executed. It will be appreciated that operations that are symbolically represented include the manipulation by a processor, such as a central processing unit, of electrical signals representing data bits and the maintenance of data bits at memory locations, such as in system memory, as well as other processing of signals. The memory locations where data bits are maintained are physical locations that have particular electrical, magnetic, optical, or organic properties corresponding to the data bits.

When implemented in software, the elements of the invention are essentially the code segments to perform the necessary tasks. The code segments can be stored in a processor readable medium, which may include any medium that can store or transfer information. Examples of the processor readable mediums include an electronic circuit, a semiconductor memory device, a read-only memory (ROM), a flash memory or other non-volatile memory, a floppy diskette, a CD-ROM, an optical disk, a hard disk, etc.

Exemplary Embodiments

Referring now to the figures, FIG. 1 depicts a graphical representation of a system including a display device which may be configured to provide one or more commands to a remote control according to one embodiment of the invention. As depicted, system 100 includes display device 105 and remote control 110. Display device 105 may be configured to receive one or more wireless commands from remote control 110, shown as 115. By way of example, commands transmitted by remote control 110 and received by display device 105 may relate to commands for controlling power, volume adjustment, channel adjustment, source/input selection, navigation of menu and interface features of the display device 105, etc. According to one embodiment, remote control 110 may relate to a manufacturer remote associated with the manufacturer of the display device. In certain embodiments remote control 110 may relate to a universal, or programmable remote control.

According to another embodiment, remote control 110 may be configured to interoperate with display device 110 and one or more peripheral devices 125_{1-n}. By way of example, remote control 110 may be configured to transmit one or more commands to set-top box 125₁, media player 125₂ (e.g., DVD™, Blu-Ray™, etc.) and gaming console 130. Although not depicted in FIG. 1, it should also be appreciated that remote control 110 may be configured to operate with other peripheral devices such as audio/video receiver, radio and media players in general.

As will be discussed in more detail below, one advantage of the invention may allow for programming of remote control 110 by display device 105 based on one or more commands generated by the display device. In that fashion, operation of a remote control may be simplified for a user in comparison to

the conventional methods. According to another embodiment, display device 105 may be configured for wireless communication, shown as 120, with remote control 110 using one or more communication types. By way of example, display device 105 may be configured to transmit optical signals (e.g., IR signals) to provide line of sight communication with remote control 110. Display device 105 may be configured to transmit one or more commands in order to program the format and type of transmission based on a plurality of display device types and manufactures. In another embodiment, display device 105 may be configured for short range communication (e.g., radio frequency (RF), Bluetooth®, Wifi, etc.) with remote control 110.

According to another embodiment, display device 105 may be configured to receive a configuration profile from remote control 110. In that fashion, the display device may be able to determine whether a configuration change is required during user selection of an input mode. For example, a user selection identifying an input associated with the same devices as a previous input may not require a configuration change of the remote control.

Wireless communication by display device 105 may be associated with one or more inputs selected by a user or activity modes. As will be discussed in more detail below, display device 105 may include one or more inputs to receive data for display or output from peripheral devices 125_{1-n}. According to another embodiment, display device 105 may be configured to display a message, shown as 130, when commands have been transmitted to remote control 110. For example, based on an update configuration of the remote control to operate a media player coupled to an input of display device 105, the display device may display a message such as RC update to indicate an update to the control functionality for the user. Further, one or more buttons of remote control 110 may now be configured to exclusively operate the media player and/or one of the plurality of devices.

Remote control 110 may further be configured to operate one or more devices without requiring the user to identify a device prior to selecting a command. For example, when a user selects an input associated with a disc player, display device 105 may be configured to transmit a command to configure the operation of one or more playback buttons (e.g., play, stop, advance, etc) to control the disc player. Additionally, buttons of remote control 110 associated with volume adjustment will control the display device.

Additionally, display device 105 and remote control 110 may be configured for short range communication, such as communication based on an 802.11 protocol. As such, remote control 110 may be configured to receive programming data for the remote control. Parameters and settings for communications with the one or more devices may be stored on remote control 105. Settings for communication by the display device may similarly be stored in memory. In one embodiment settings can provide for one or more IR formats, short range communication profiles (e.g., Bluetooth™ profiles) and network communication protocols. In an exemplary embodiment, display device 105 may be configured to store up to twenty communication settings.

Referring now to FIG. 2, a simplified block diagram is depicted of the display device of FIG. 1 according to one or more embodiments of the invention. As shown in FIG. 2, display device 200 (e.g., display device 105) includes processor 205, display 210, memory 215, communication interface 220, user input interface 225 and input/output (I/O) interface 230. Processor 205 may be configured to control operation of display device 200 based on one or more computer executable instructions stored in memory 215. Display 210 may be

employed to display one or more of menu functions, an input mode, input modes available, current input mode of the display device, programming information, etc. Display **210** may further be configured to display data received from one or more devices (e.g., peripheral devices **125_{1-n}**).

Communication interface **220** may be configured to provide one or more communications services provided by the display device. In an exemplary embodiment, communication interface **220** may include one or more elements to allow for transmission of one or more of line of sight commands and non-line of sight communications. Communication interface **220** may be controlled by processor **205** for transmission and communication commands by display device **200**. Although communication interface **220** is shown as a single element, it should be appreciated that display device **200** may include one or more elements for wireless communication. Further, communication interface **220** may include IR elements and RF components for infrared (IR) communication and radio frequency (RF) communication, respectively.

User input **225** of display device **200** may relate to one or more buttons (e.g., numerical keypad, volume control, channel control, menu controls), a pointing device (e.g., track ball), mode selection buttons, play back functionality (e.g., play, stop, pause, forward, reverse, slow motion, etc). In that fashion, a user of display device **200** can command one or more devices. Buttons of user input **225** may include hard and soft buttons, wherein functionality of the soft buttons may be based on an activity mode.

Referring now to FIG. **3**, a simplified block diagram is depicted of the remote control of FIG. **1** according to one or more embodiments of the invention. As shown in FIG. **3**, remote control **300** (e.g., remote control **110**) includes user input **305**, processor **310**, communication interface **315**, and memory **320**. User input **305** relates to one or more buttons of the remote control and can include a numerical keypad, channel selector, volume adjustment, menu keys, input selection, etc. Processor **310** can configure the operation of one or more keys of user input **305**, based on one or more commands received by remote control **300** via communication interface **315**, to operate with one or more devices, such as a display device (e.g., display device **105**). Accordingly, communication interface **315** of remote control may be configured to provide one or more of IR and RF communication with a display device and one or more peripheral devices based on a configured of the remote control. Remote control **300** may be configured by processor **310** and/or one or more instruction stored in memory **320**. Memory **320** may further store communication codes and formats for communicating with one or more devices. According to one embodiment, the remote control **300** maybe configured to transmit a current configuration setting to the display device using communication interface **315**.

Remote control **300** may be configured to include one or more activity modes, wherein the remote control may be configured for at least one type of wireless transmission based on selection of one or more buttons. In one embodiment, the remote control may be configured for communication base on infrared (IR) and radio frequency (RF) communication. In that fashion, the remote control may be specifically configured to operate a plurality of devices. Additionally, the input interface of the remote control may include one or more buttons and input devices to allow for interoperability with a plurality of devices and allow a user to provide data to one or more applications which are provided by a device. Accordingly, the present invention allows for a single device to control one or more devices while maintaining packaging of the remote control within an acceptable size.

According to one embodiment, remote control **300** may be programmed to operate with the one or more devices based on a configuration mode. In that fashion, buttons of remote control **300** may be employed by a user to operate the one or more devices.

Referring now to FIG. **4**, a process is depicted for configuring a remote control by a display device according to one or more embodiments. Process **400** may be initiated by detection of a user selection of a display device (e.g. display device **105**) at block **405**. For example, using one of a remote control and user interface of the display device, a user may select one or more input sources for the display device, including but not limited to a set-top box, disc player, media player, etc. An input may relate to a source of input data, such as an HDMI (High-Definition Multimedia Interface) terminal or based on the components coupled to the display device. Based on the user selection, operation of a remote control of the device may be adjusted to better suit the operators needs. The display device may then determine one or more configuration commands at block **410** based on the user selection. Commands may relate to one or more commands to program the operation of a remote control with one or more devices. A command may further be associated with a configuration identifying operation of remote control with one or more devices. The configuration may relate to adjusting or setting buttons of the remote control for operation with one or more devices associated with the input.

In certain embodiments, one or more commands determine at block **410** may be based on detecting devices coupled to an input terminal selected. For example, based on the devices detected, a command generated by the display device may be tailored to a particular device. Commands may similarly be based on modes. For example, one or more devices associated with an activity mode such, such as a home theater mode. According to another embodiment, commands may be based on detection of data on one or more inputs.

According to another embodiment, the display device may be configured to determine on or more commands based on a configuration profile received from the remote control. The remote control profile including one or more settings of the remote control.

The display device may then transmit to the remote control the determined commands at block **415**. The commands transmitted may include codes to program the remote control, including specifying operation for one or more buttons and/or sets of buttons. The coded format of a command may be determined and utilized by the remote control to establish operation of the buttons. Programming of the remote based on a command may be based on preprogramming of the remote control with one or more devices coupled to the input.

Process **400** may further include displaying an operating change via a display screen (e.g., display **130**). In certain embodiments, the display or an operating change may indicate that the control functions of the remote control have been modified. The display may relate to a text message and/or display of a symbol for a short period of time. In certain embodiments, the remote control may display a flash of light to indicate a change in operation based on a command from the display device.

Referring now to FIG. **5**, a process is depicted for configuring a remote control by a display device according to one or more embodiments. Process **500** may be initiated by a display device (e.g., display device **105**) by receiving a remote control configuration at block **505**. For example, a remote control configuration may be transmitted periodically by the remote control (e.g. remote control **110**) to the display device. The display device can detect a user selection of an input at block

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510. Based on the user selection, the display device may check if a configuration change is required for the remote control at decision block **515**. Determination of a change by the display device may be based on the devices associated with the selected input. When the remote control does not require a configuration change (“NO” path out of decision block **515**) the display device may await selection of a display device input at block **510**. When the remote control does require a configuration change (“YES” path out of decision block **515**) the display device may then determine s configuration required for the remote control at block **520**. The display device may determine the configuration change based on the remote control configuration received at block **505** and one or more devices associated with the input. Based on the configuration, the display device may transmit a command to the remote control at block **525**.

Process **500** may further include receiving a remote control update at block **530**. In one embodiment, the remote control device may transmit a signal to the display device confirming receipt of the command and programming of the remote control. At block **535**, the display device may display an update (e.g., message **130**) based on a configuration change of the remote control.

While this invention has been particularly shown and described with references to exemplary embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the scope of the invention encompassed by the appended claims.

What is claimed is:

1. A method for configuring operation of a remote control by a display device, the method comprising the acts of:

detecting user selection of an input of the display device; determining a command for the remote control based on the user selection of the input, wherein the command identifies a configuration for the remote control; and transmitting the command to the remote control, by the display device, for configuration of the remote control, wherein the configuration specifies operation of the remote control with one or more devices associated with the input;

wherein the user selection of the input of the display device comprises a user selection of an input terminal of the display device.

2. The method of claim **1**, wherein user selection of an input relates to one or more of a remote control transmission, and a user selection of an interface of the display device to select an input.

3. The method of claim **1**, wherein the input relates to an input data source coupled to the display device.

4. The method of claim **1**, wherein determining a command includes detecting one or more devices coupled to the input terminal and determining a configuration change for the remote control.

5. The method of claim **1**, wherein the configuration specifies operation of one or more buttons of the remote control.

6. The method of claim **1**, wherein transmission of the command relates to transmission of a coded pattern as one of a radio frequency (RF) transmission, infrared (IR) transmission, short-range wireless communication, and wireless transmission in general.

7. The method of claim **1**, further comprising receiving a configuration profile, by the display device, from the remote control and determining the command based on the configuration profile.

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8. The method of claim **1**, further comprising displaying a message, by the display device, to indicate a configuration change of the remote control.

9. A system comprising:

a remote control; and

a display device, the display device configured to:

detect user selection of an input of the display device; determine a command for the remote control based on the user selection of the input, wherein the command identifies a configuration for the remote control; and transmit the command to the remote control, by the display device, for configuration of the remote control, wherein the configuration specifies operation of the remote control with one or more devices associated with the input

wherein the user selection of the input of the display device comprises a user selection of an input terminal of the display device.

10. The system of claim **9**, wherein user selection of an input relates to one or more of a remote control transmission, and a user selection of an interface of the display device to select an input.

11. The system of claim **9**, wherein the input relates an input data source coupled to the display device.

12. The system of claim **9**, wherein the display device is further configured to detect one or more devices coupled to the input terminal and determine a configuration change for the remote control to determine a command.

13. The system of claim **9**, wherein the configuration specifies operation of one or more buttons of the remote control.

14. The system of claim **9**, wherein transmission of a command by the display device relates to transmission of a coded pattern as one of a radio frequency (RF) transmission, infrared (IR) transmission, short-range wireless communication, and wireless transmission in general.

15. The system of claim **9**, wherein the display device is further configured to receive a configuration profile from the remote control and determine the command based on the configuration profile.

16. The system of claim **9**, wherein the display device is further configured to display a message to indicate a configuration change of the remote control.

17. A display device configured to configure operation of a remote control associated with the display device, the display device comprising:

a processor configured to

detect a user selection of an input of the display device, and

determine a command for the remote control based on the user selection of the input, wherein the command identifies a configuration for the remote control; and a communications module configured to transmit the command to the remote control, by the display device, for configuration of the remote control,

wherein the configuration specifies operation of the remote control with one or more devices associated with the input and

wherein the user selection of the input of the display device comprises a user selection of an input terminal of the display device.

18. The display device of claim **17**, wherein user selection of an input relates to one or more of a remote control transmission, and a user selection of an interface of the display device to select an input.

19. The display device of claim **17**, wherein the input relates to an input data source coupled to the display.

20. The display device of claim 17, wherein the processor is further configured to detect one or more devices coupled to the input terminal and determine a configuration change for the remote control to determine a command.

21. The display device of claim 17, wherein the configuration specifies operation of one or more buttons of the remote control. 5

22. The display device of claim 17, wherein the communication module is further configured to transmit of a coded pattern as one of a radio frequency (RF) transmission, infrared (IR) transmission, short-range wireless communication, and wireless transmission in general, for transmission of the command. 10

23. The display device of claim 17, wherein the communication module is further configured to receive a configuration profile from the remote control and the processor is configured to determine the command based on the configuration profile. 15

24. The display device of claim 17, wherein the display devices comprises a display configured to displaying a message to indicate a configuration change of the remote control. 20

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